

and then pursue their way northwards, crossing the Balkan Mountains into the plains of the Danube and Russia, to return again in the autumn. And, of course, for an inquiring naturalist a seaport town is always a desirable place, for here come sailors from foreign lands with tales of strange birds and beasts and plants, specimens of which they sometimes bring home with them. . . . We may be sure that young Aristotle was quick to profit by these chances."

Whatever may have been the point in Aristotle's career at which the "History" was projected, there can be little doubt that he was always taking such opportunities as offered for making additions and corrections. It is also reasonable to suppose that the book as we have it may contain annotations by some of his pupils. The treatises "De Partibus" and "De Generatione" are shown by internal evidence to be later as a whole than the "History."

The present excellent translations will serve, it may be hoped, to induce many students of the history of biological knowledge to undertake an examination at first hand of the works of this great scientific pioneer. Aristotle suffers little by intelligent translation, for his excellence lies in the matter of his writings rather than in their form. "The author himself," as Prof. Platt justly observes, "would have been the last man in the world to complain of any sacrifice of graces of style." Though the translators have no doubt nearly always succeeded in "representing as exactly as possible what Aristotle said or meant to say," it must not be supposed that they have denied themselves the use of good and vigorous English. Dr. Ogle's translation of the "De Partibus" in especial (a revision of his former well-known version) is admirable as a piece of literary workmanship. The notes of all three translators are good and useful so far as they go; but to produce a completely annotated edition of Aristotle's biological works in the light of modern knowledge would be a task from which the boldest might shrink. The typography and general get-up of these volumes are all that could be desired, and are worthy of the reputation of the Clarendon Press. It should always be remembered with gratitude that their publication is due to the generous provisions of the will of the late Prof. Jowett.

F. A. D.

#### SOUTH AFRICAN ORCHIDS.

*Icones Orchidearum Austro-Africanarum Extra-Tropicarum; or, Figures, with Descriptions of Extra-Tropical South African Orchids.* By Dr. Harry Bolus. Vol. ii., pp. vi+200+100 plates. (London: Wm. Wesley and Son, 1911.) Price 2l. 2s. net.

TO Dr. Bolus's many botanical friends this volume, his last contribution to South African orchidology, has a special interest. Its production was the ostensible motive of his frequent journeys home during the past few years, and the revision for the press of its last few pages was completed on the eve of his death, which occurred shortly after his arrival in England early in the summer of the present year. The copies of his book, distributed by his niece and co-worker, Miss H. M. L. Kensit, are a fitting memento of the author and of the important influence he exerted on the progress of botanical exploration in South Africa.

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Bolus's botanical work was not confined to the study of the orchids. His wide and critical knowledge of the heaths is embodied in his contribution on that family in the "Flora Capensis"; and his extensive herbarium, which now passes to the South African College, bears witness to his general knowledge of the flora. But he will probably be best known for his careful study of the orchids, the results of which are embodied in various papers, but especially in the volume on the "Orchids of the Cape Peninsula" and the two volumes of the "Orchids of South Africa," the second of which is the subject of this notice.

The plan of the book is uniform with that of vol. i., which appeared in two parts (1893 and 1896 respectively). Excepting a few double plates and one on which are figured two species of *Mystacidium* discovered by, and dedicated to, Miss Alice Pegler, of Kentani, each of the hundred plates is devoted to one species; and the text consists of a corresponding number of quite separate technical descriptions. A characteristic feature is the duplication of each description in Latin and English. The distribution of each species is indicated by a citation of localities with collectors' names and numbers, and an indication is given of the source or sources from which the actual specimens figured were derived. The great majority of the plates were drawn from living specimens by Dr. Bolus himself, and the noting on the plate of the exact date at which the drawing was made shows that the material for the volume had been accumulating for more than twenty years. The extended period of preparation accounts for a slight want of uniformity of treatment. A few of the plates are in black and white; in the greater number, however, colour is used in proportions varying from the tinting of a simple leaf or flower to the full-blown coloured plate, such as that of *Disa uniflora* (plate 63). All are alike admirably clear, and include, in addition to the habit illustration, careful detailed drawings of the parts of the flower.

The species figured and described represent nineteen genera, but a large proportion are included in the typically South African genera, *Disa*, *Satyrium*, and *Eulophia*. Some are well-known species; a good proportion were discovered and have been previously described by Dr. Bolus, while a few, such as *Eulophia Pillansii* and *Mystacidium Aliciae*, are described here for the first time. Some are of special interest as representing rediscovered species. For instance, *Disa Telipogonis*, Reichenb. f., a remarkable little plant found by Berg on the summit of Table Mountain in 1816, was rediscovered in the same locality by Miss Kensit in 1904. The only other record of its occurrence was from the mountains in the Wellington district, where Dr. Schlechter found it in 1896, at a somewhat lower elevation.

A pleasing feature of Dr. Bolus's work is the readiness with which he gives credit wherever possible to those who have helped in his work either by sending specimens, or with their critical knowledge. Among these helpers may be mentioned, besides Miss Kensit, Dr. Schlechter, whose knowledge of the Cape orchids was perhaps second only to that possessed by Dr. Bolus, and Miss Alice Pegler, who has done good work

in the botanical exploration of the Kentani district, and to whom are dedicated the two new species of *Mystacidium* figured—her own discoveries. To these and others Dr. Bolus gives grateful recognition in his introductory note.

An index comprising a list of species and synonyms is placed at the end of the text matter, and a good portrait of the author as a frontispiece is a pleasing addition.

A. B. R.

#### THE STUDY OF FIELD CROPS.

*Southern Field Crops (exclusive of Forage Plants).* By Prof. J. F. Duggar. Pp. xxvii+579. Rural Text-book Series; edited by L. H. Bailey. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1911.) Price 7s. 6d. net.

AT a certain stage in his studies the agricultural student is called upon to consider crop-growing in its economic aspects, and he soon finds himself in a wide and rather indefinite field, where, in theory, his chemistry, botany, entomology, &c., ought to meet, and where the bearing of all the sciences on practical agriculture ought to be made manifest. In theory the student is to be directed in his studies of this branch of the subject by a man whose attainments in these several sciences is beyond reproach, and who has also a first-hand acquaintance with the economic problems involved. But in practice this ideal combination is never attained, and consequently the study of field crops goes in with agriculture, and is left entirely to the empiricist, no man of science having set up any claim to deal with them from the economic point of view.

Like other teachers of agriculture, Mr. Duggar is an empiricist; but he is an enlightened one, and makes liberal use of the data accumulated by his *confrères* on the science side. He deals, as one would expect, very fully with maize and cotton, to each of which some ten chapters are devoted, the rest of the book being occupied with the less common crops—wheat, oats, sorghum, rice, &c. The usual arrangement of the subject-matter is to begin with the structure of the plant; then to pass on to its races and varieties, the methods of breeding or improvement, the soils and fertilisers best adapted, the appropriate tillage and cultivation, and finally the insect and fungoid pests. Thus the whole field of science is covered, from chemistry and botany to entomology.

Considering how much such a task is beyond the powers of any one man, Mr. Duggar has done remarkably well. The purist in method, of course, might object to the empirical treatment of the subject, and feel dissatisfied with the numerous bald statements, such as "Insect pests [of oats] are the same as those of wheat, except that the oat is not attacked by the Hessian fly," just as the purist in language (and many others as well) might object to another statement—"ensilage is the verb, as 'to ensilage corn,' with the accent on the middle syllable." But these difficulties are inherent in the subject, and it would be unreasonable to judge the book from a point of view other than that from which it was written and will probably be used.

For in the meantime, while he is waiting for the true scientific treatment of crop husbandry to be developed, the student needs some one book in which he can find collected all the information he wants about ordinary crops. He is more concerned with the facts themselves than with their bearing on one another or on any central hypothesis. From this point of view Mr. Duggar's book is very good; there has obviously been a great deal of work expended in collecting the facts, and the references to the literature at the end of each chapter, if not entirely satisfying to the man of science, will at any rate put the student in touch with other work on the subject. In the present state of our knowledge the collection of the facts relating to the growth of crops is extremely necessary for further progress, and Mr. Duggar has contributed material that will be found distinctly useful.

As in the other members of this series, the book is well illustrated, and the pictures are well chosen, there being remarkably few of the ordinary useless field views. "An honest book," Dr. Bailey calls it in his introduction; "... these makers of observation text-books, that present the crops and the animals in their real and living details, will set going a great quiet movement to examine minutely the conditions of agricultural failure and success."

E. J. RUSSELL.

#### PROPERTIES OF MATTER.

*General Physics for Students: a Text-book on the Fundamental Properties of Matter.* By E. Edser. Pp. ix+632. (London: Macmillan and Co., Ltd., 1911.) Price 7s. 6d.

IT is not often that a text-book, published under a familiar title, presents so many novel and valuable features as Mr. Edser's latest production, "General Physics for Students." It is scarcely too much to say that with regard to contents and general mode of treatment the book forms a class for itself. By the collection of so much fresh material into one volume, Mr. Edser has made accessible to students many parts of physics, which, either from lack of time or initiative, they have hitherto been unable to appreciate. This has been done in no meagre fashion, the details, both experimental and theoretical, being consistently of a very comprehensive character.

The very care which has obviously been bestowed upon the work in order to suit it to the needs of students has, we think, been the cause of the one unfortunate feature of the book. This is the avoidance of the use of calculus notation—a procedure which the author seeks to justify in the preface. There is undoubtedly much to be said for such omission in the case of junior students whose teaching involves but rare recourse to calculus methods; but to continue the practice through a book of this kind is open to grave objections. The students who use the book may be divided into two classes—those sufficiently acquainted with calculus notation and methods, and those ignorant of them. The former class are liable to become annoyed at the repeated integration from first principles of the same function; the latter class may become accustomed to regard the laborious processes given as essential parts of the problems in